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September 19, 1959

VOL. 34 NO. 12 PAGES 377-392

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



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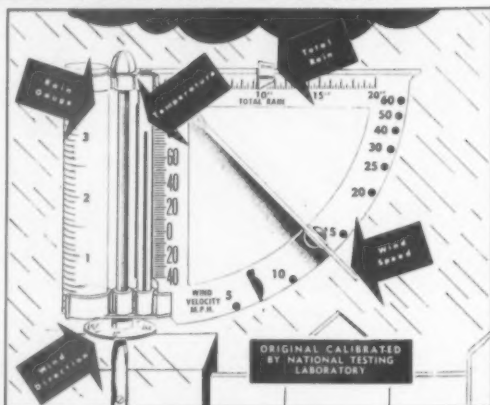
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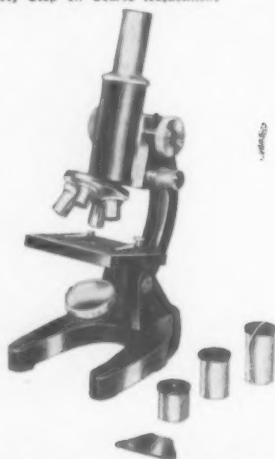


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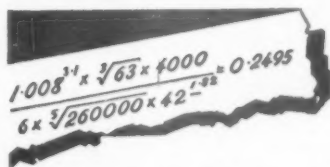
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PUBLIC HEALTH

Sample Milk for Drug

A technique that can detect minute amounts of penicillin in milk within a very short time will aid the Food and Drug Administration in its new milk survey.

THE FOOD and Drug Administration will shortly begin tapping milk supplies throughout the country in an effort to detect and remove from the market all milk that contains penicillin.

A recent nation-wide milk survey disclosed that more than three percent of the samples contained this very potent antibiotic.

Although its concentration in milk is very low, penicillin is capable of causing reactions in highly sensitive persons. More than 18,000,000 Americans could have reactions from these small amounts.

Persons allergic to this antibiotic may develop a fever or rash, or experience severe vomiting.

The basis for sampling is a new technique that can detect the presence of as little as 0.05 units of penicillin per milliliter of milk within two and one half hours. The method currently used takes up to 18 hours, a long delay for a perishable food such as milk. Dr. Henry Welch, division of antibiotics, Department of Agriculture, told SCIENCE SERVICE.

Beginning soon, milk shipped in interstate commerce that is found to contain penicillin could be seized and the shipper prosecuted by the Federal Government, he

explained. State and local regulators will prosecute intrastate violators.

The new technique was developed by Bernard Arret and Amiel Kirshbaum of the antibiotics division. Their report will appear in the *Journal of Milk and Food Technology* (Oct.).

Penicillin finds its way into milk when the drug is infused into cows suffering from mastitis, an inflammation of the udder. Since farmers themselves can administer the drug to their animals, Federal labeling regulations warn that the milk from such treated animals should not be used for human consumption before three days after the last dose. Apparently, some have not complied with the regulations.

Furthermore, it has been found that many manufacturers of the drug preparation boosted the content of the dose to 1,500,000 units. Repeated doses of 25,000 units are considered adequate. Therefore, such highly potent doses increase the length of time required to eliminate the drug from a treated cow's milk. FDA has limited the dose to 100,000 units per dose.

Within the past few years there has been a considerable drop in the percentage of penicillin-containing milk samples, Dr. Welch pointed out. During 1954, 1955 and

1956, three surveys dipped into milk supplies from every state. At that time 6.9% of the samples proved to be adulterated with penicillin. A survey in the fall of 1958 and winter of 1959 revealed that this percentage has dropped to 3.7.

Science News Letter, September 19, 1959

GENETICS

Chromosome Linkage in Domestic Chickens

THE DEMONSTRATION of a chromosome "switch" in a rooster, reported in *Science* (Aug. 14), should help researchers solve some genetic problems.

Chickens are a popular animal for genetic studies, largely for economic reasons, says Dr. Earl H. Newcomer of the University of Connecticut. However, scientists have not known for sure until recently just how many chromosomes a chicken has. Now there is not only evidence that males have 12 chromosomes, and the females have 11, but new evidence for a reciprocal translocation, or exchange, involving the first and second chromosomes.

This finding means that it should be possible to show the association between a known linkage group and its respective chromosome, Dr. Newcomer explains.

A linkage group describes several genes that "go together." For example, when an individual shows the characteristics for gene P, he will also have the characteristic for gene L. The genes that form these groups are usually physically close to one another. By studying linkage groups scientists can "map" the chromosome for a species.

A white Leghorn male, 22 months old, was the source of the chromosomes studied. The bird was suspected of being a carrier of a translocation, caused by X-rays, because of the unusual hatching performance of its offspring. The offspring, when mated with normal birds, produced young showing both normal and "translocation behavior."

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ASTRONOMY

Amateur Discovers Two New Comets

See Front Cover

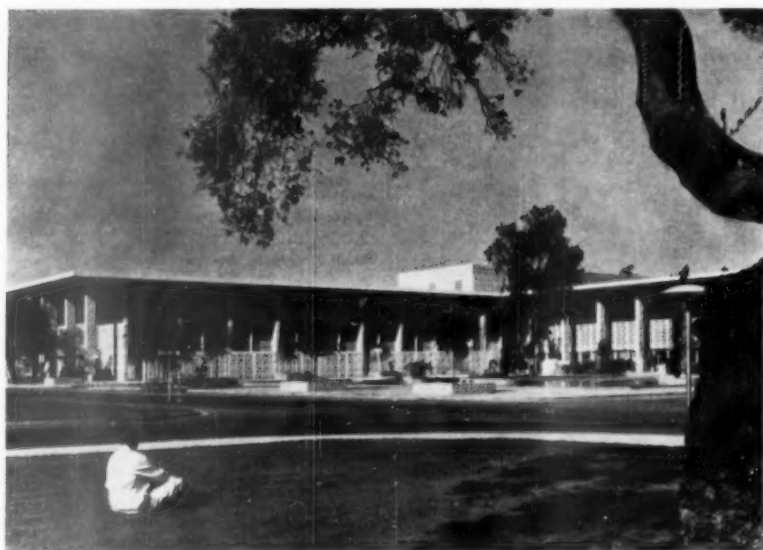
A BRITISH SCHOOL teacher and amateur astronomer has reported sighting two new comets.

Comet Alcock 1959f, as one is called (named after its discoverer, George Alcock), is the brightest comet seen in several years. It was first seen on Aug. 30.

The photograph on the cover of this week's SCIENCE NEWS LETTER is a ten-minute exposure of the comet, taken at the U. S. Naval Observatory, Flagstaff, Ariz., on Tuesday morning, Sept. 1. The short lines going across the picture are stars. They are trailed because the plate was moved during exposure to follow the comet's motion.

Comet 1959e, the other comet discovered by Mr. Alcock, is reported to be not as bright as Comet 1959f. It also lacks the tail observed on Comet 1959f.

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MEDICAL CENTER—A medical student relaxes on the lawn approaching the new Stanford Medical Center, dedicated on Sept. 17 and 18 at Palo Alto, Calif. The Center is designed so that related medical facilities are on the same floor level. For example, obstetrics, gynecology and pediatrics are on the third floor of the Palo Alto-Stanford Hospital within the Center. Provision has been made for expansion and changes in existing buildings.

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ASTRONAUTICS

Russia Hits Moon

A successful strike on the moon has been achieved by Russian scientists in what they describe as an interplanetary victory that will lead to international cooperation in space.

NOW THAT the moon has been hit by a missile from the earth, scientists are worried about possible contamination of the moon by viruses and bacteria from the earth.

If the Russians did not sterilize effectively the inside of their moon rocket before firing it, mankind may never know whether the moon, prior to the Russian hit, had viruses upon it as dormant molecules.

Details currently available as this issue of the SCIENCE NEWS LETTER went to press are the following:

Size and shape: 854.8 pound sphere.

Time of moon hit: 5:02:24 p.m. EDT, Sunday, Sept. 13. The Russians are said to have placed the USSR emblem of the hammer and sickle on the moon's surface.

Science News Letter, September 19, 1959

International Negotiations

Last year when serious plans for hitting the moon were being made by both United States and Soviet scientists, there were negotiations between the Soviet and U. S. scientists to prevent importation upon the moon of biological material from earth. (SNL, May 24, 1958, p. 323.) The Soviet scientists are reported to have taken the precaution of having their space instruments sterile, just as instruments in a hospital operating room are germ-free. U. S. scientists hope that this was done, for the sake of future scientific studies.

The friction of the air would make the outside skin of the rocket missile sterile but the inside should have been fumigated prior to launching.

The moon is lifeless, scientists are quite sure, unless there are viruses there surviving from a time when the moon may have been part of the earth and therefore in contact with possible life in the early stages of the solar system several billions of years ago.

Contaminating the Moon

If the Soviet missile did dirty the moon, it may never be known for sure whether this was the case.

Another fear of scientists, that the first rocket to the moon would set off a gigantic explosion of powerful lunar chemicals, seems to have been disproved by the lunar missile landing. (SNL, July 12, 1958, p. 22.)

It was considered that the otherwise barren surface of the moon is coated with a highly reactive cosmic "dust" consisting in large part of unstable free chemical radicals, frozen out of action against the moon's extremely cold surface. A foreign substance might trigger these unfinished compounds into violent reaction, particularly if the substance were organic, like rubber or plastics.

Cosmic Explosion

That a major explosion did not occur from the impact of the Soviet rocket does not necessarily disprove this theory as the suitable triggering kind of earthly chemicals may not have been in the missile. Later reports may even indicate that there was more effect from the landing of the rocket than could have been caused by the impact alone.

SCIENCE NEWS LETTER

VOL. 76 SEPTEMBER 19, 1959 NO. 12

Edited by WATSON DAVIS

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N. St., N.W., Washington 6, D. C., NORTH 7-2255. Cable Address: SCIENSERV.

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Printed in U.S.A. Second class postage paid at Washington, D. C. Established in mimeograph form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index. Member Audit Bureau of Circulation.

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ASTRONOMY

Moon Camera Planned

A new type of panoramic camera, geared to the spin stabilizer in a man-made satellite, has been developed to take better photographs of the moon.

A BETTER camera for moon exploration via satellites was described to the International Astronautical Federation Congress in London, England.

Merton E. Davies of the Rand Corporation, Santa Monica, Calif., reported a new type of panoramic camera has been developed which could be shipped as part of the payload of early space ships.

Earth-based telescopes, which have long been the principal tool for the exploration of the moon, are totally inadequate for the job. They always give answers which produce more penetrating questions. Even the television cameras, such as those carried by Pioneers I and III, do not provide adequate pictures.

The new camera, said Mr. Davies, could be carried in a four-stage rocket similar to the U. S. Army's Pioneer III and would be geared to the spin stabilizer so that it would take pictures without blurring them. It would use the spin to perform its panoramic scanning.

Careful timing would be a major essential in this camera, Mr. Davies explained. This could be achieved by a device similar to that used to measure the spin rate and lunar direction on Pioneer III.

To maintain the focus of the lens and

keep the film flexible, Mr. Davies said it would be desirable to pressurize the camera and control the temperature and humidity near the lenses and film.

Lunar photographs would probably have much greater contrast than those at high altitudes near the earth, he predicted. Such earth pictures are often marred by the scattering of non-image forming light into the optical system. A film which has a large dynamic range would be preferred for lunar photography. It should have a fast speed to allow high shutter speeds, perhaps of 1/2,000 second.

The camera would be packed in a three-foot sphere designed to survive severe heating as it re-entered the earth's atmosphere. An ablating plastic surface has been suggested for this purpose. These materials absorb large quantities of heat as they are vaporized during the descent through the atmosphere. The total weight of the payload capsule would be 400 pounds, of which 40 or 50 pounds would be vaporized during descent.

The problem of actual recovery, probably from the sea, would be the same as that with other space capsules.

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ASTRONAUTICS

Must Risk Life for Moon

No single instrument or group of instruments can duplicate the sensing, recording, interpreting abilities of man, two scientists report. Exploration of space thus means a human risk.

THE ARGUMENT that we cannot afford to risk human life to explore the moon is unsound, both historically and economically, two scientists from the National Aeronautics and Space Administration, Washington, D. C., told the International Astronautical Federation meeting in London, England.

Milton W. Rosen and F. Carl Schwenk said man has always dominated the history of exploration and has been able to cope with all physical hazards to reach inaccessible regions of the earth.

They conceded that exploration implies risk of life and that instruments could be built to withstand a greater range of temperature, pressure, acceleration and radiation than the sensitive body of man.

"But," they argued, "while an instrument can do one or several things, there are thousands, indeed millions, of things it cannot do. To put it bluntly, no instrument or array of instruments exists that can duplicate the sensing capabilities of a man.

When this is added to man's capability to record, remember, interpret and discriminate, we see how paltry are the powers of the most sophisticated mechanical substitute."

Arguing the merits of sending rockets on direct flight and by the orbital rendezvous methods, the scientists said that the direct flight method would be more costly, but would be better in every way.

They described a vehicle which could make a round-trip to the moon. A two and a half day flight from earth to the moon was chosen, as the shorter trip time minimizes effects of errors in burnout velocity. The rocket would have five or six stages.

The first three stages would accelerate the payload and remaining stages to an initial velocity of 36,000 feet per second. After coasting to the vicinity of the moon, the fourth stage would lower the vehicle to a landing on the moon.

At the time of departure, the fifth stage

would propel the vehicle toward the earth. After two and a half days, the payload approaches the earth. A sixth stage of propulsion could be used to slow the payload to orbital speed, or the vehicle could enter the earth's atmosphere at hyperbolic velocity.

This Nova rocket, as the scientists called it, would carry two men in a truncated cone 14 feet high and with a maximum diameter of 12 feet. They could have a 12-day stay on the moon and in that short time the NASA scientists think they could collect more lunar facts than all the instrument-equipped vehicles sent up before they get there.

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BIOLOGY

Skim Milk Halts Plant Virus Damage

SOMETHING in skim milk halts the destructive effects of a plant virus, a plant pathologist has reported.

In laboratory tests certain milk substances called globulins were found to inhibit tobacco mosaic virus, Dr. G. B. Lucas of North Carolina State College told the American Phytopathological Society meeting in University Park, Pa. The skim milk not only protected tobacco plants, but peppers and tomatoes also.

While it is still too early to say, Dr. Lucas pointed to the possibility of this milk substance being useful in controlling animal virus diseases. This year, he said, the scientists are recommending that tobacco farmers spray their crops with a skim milk solution. Researchers have found that when tomato and pepper pickers dip their hands in skim milk, the incidence of mosaic virus disease is greatly reduced.

Tests with skim milk gave nearly 100% inhibition of disease symptoms—leaf lesions. Whey proteins were also very effective. Various substances, especially alpha globulin, in cow blood were also tested with good results.

The experiments, carried out with Dr. W. W. Hare of Mississippi State University, point to some presently unknown globulins in milk as causing this disease inhibition.

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ELECTRONICS

Human-Like Computer Reads and Writes

A MACHINE can read the numbers on checks, deposit slips and other documents, process them, and select and post them to the correct customer's account.

This device using solid-state electronics is being introduced to the business world by the Burroughs Research Center, Paoli, Pa., as a data system that reads and writes language hitherto handled by the human eye.

A line of small numbers printed in magnetic ink along the bottom of checks can be read and processed by the visible record computer system.

Science News Letter, September 19, 1959

PUBLIC HEALTH

Report Cosmetic Hazard

BREATHING in hair spray was responsible for one woman's symptoms of cough, loss of appetite and suspicious shadows on her lungs, a British scientist reports.

Other cases of similar shadows which show up in X-rays and have no known cause may be due to inhaling hair spray, suggests Dr. B. G. Edelston, physician-in-charge at the Folkestone and Dover Hospitals' chest clinics.

All tests for tuberculosis and other diseases, blood tests and physical examinations were normal in the woman studied. However, she had a year-long history of cough, loss of energy and appetite and a general "un-well" feeling. Chest X-rays showed enlargement of the lymph nodes in both lungs. The patient said that she had used two well-known brands of hair spray beginning about 12 months previously. She had used them perhaps twice a day for about six months, and then stopped.

Several researchers have found that natural and synthetic resins—the "varnish" in the hair spray—can produce granuloma or granule-like lumps in the lungs, Dr. Edelston reports. Although laboratory experiments have shown some of these substances can cause cancer-like growths in rats and mice, their effect on human beings

is still not clear. Possibly 15 to 30 years may have to pass before such tumors develop in a person, Dr. Edelston points out.

"The increasing use of cosmetics in all countries may create new medical problems because some constituents used in their manufacture are unknown," the British scientist says. "Usually these formulas are jealously guarded secrets and the makers are not as a rule in a position to estimate the possible dangers to users of their products. Hair sprays thus come into the category of hazardous aids to beauty, despite the careful directions for their application on the containers."

Manufacturers might advise women to use face-masks before using the hair sprays and to move out of the spray as quickly as possible, Dr. Edelston suggests.

Several months after the patient's first X-rays, her lungs appeared almost normal. The irritant may have been removed from the lungs and stored elsewhere in the body, possibly in the liver or spleen. The ultimate effects of the irritant can be determined only by long observation, Dr. Edelston concludes. Details of his study appear in *The Lancet* (Aug. 15).

Science News Letter, September 19, 1959

OCEANOGRAPHY

Undersea Vessel Designed

AN UNDERSEA research vessel capable of exploring the oceans at all depths is being designed by the U. S. Naval Ordnance Testing Station, China Lake, Calif.

The vessel's design is based on the principles established by Auguste Piccard in his bathyscaphs. However, the new vessel is expected to be more mobile, have a greater cruising range and carry more scientific equipment than any previous deep-diving vessel.

Still in the design stage, the vessel was described to marine scientists attending the International Oceanographic Congress at United Nations, N. Y., by Dr. Rene L. Engel and Firth Pierce of the Testing Station. Once appropriations are received, Dr. Engel said, the vessel should take about a year to build.

Known as the DRV—for deep-sea research vessel—the 69-foot vessel has a streamlined shape, resembling a submarine more than the spherical diving bell.

Approximately nine feet in diameter and weighing 83 tons, the vessel consists of two pressure resistant spheres. The forward sphere accommodates a crew of three and all control, navigation and recording equipment, and the rear sphere contains batteries and other automatic equipment.

The forward sphere has a controlled atmosphere for 36 to 48 hours' submergence. The duration of each dive will be limited by fatigue of personnel, because sleeping quarters are not included.

Between the two spheres is a ballast tank and a flooded compartment containing equipment for obtaining and storing bottom samples.

Buoyancy will be provided by pentane or non-inflammable ammonia solution, and will be controlled by magnetically retained steel-shot ballast. The designers are also experimenting with the idea of using a soluble ballast for simpler operation. Two 20-horsepower motors in the after-body will propel the vessel at a velocity of six knots over a range of about 150 miles. The overall design is intended to give little surface friction with the water. External bow planes will permit quick vertical maneuvering. A long, pointed bumper at the nose of the vessel will carry a light and an acoustic detector.

Sea Water Hotter

ANALYSES of ocean cores suggest that the increase in the temperature of the ocean surface at the end of the last glacial period occurred rather abruptly about 11,000 years ago.

The analyses were measurements of carbon-14 content and were described by Dr. Maurice Ewing, director, and Drs. Wallace S. Broecker and Bruce C. Heezen of Columbia University's Lamont Geological Observatory, Palisades, N. Y.

The scientists said the change in oceanic conditions that brought about this warming

also is reflected in a sudden decrease in the rate of clay accumulation in the equatorial Atlantic and by a change from ventilated to stagnant conditions in the Cariaco Trench off Venezuela.

Attempts to find whether this oceanic event has a counterpart on land, the scientists said, suggest that pluvial, or rain-formed lakes, in the Great Basin, the desert area of the western U. S., dried up rapidly. They also suggest that the ice in the Great Lakes region retreated rapidly and that the Mississippi River underwent a rather sudden change in its mode of operation.

Find Buried Jellyfish

FOSSILS of jellyfish and other soft-bodied marine animals found in the rocks of past geologic ages may be the remains of organisms buried in a beach.

Louis S. Kornicker and John T. Conover of the University of Texas told the Oceanographic Congress severe storms that cause high waters and kill numerous fish can deposit an abundance of such animals above the level of high tide. There they can easily be buried by sand.

A recent severe storm in Aransas Pass, Texas, caused the ocean waters to rise 3.2 feet above normal high tide level. Several days after the storm, the scientists noticed a series of small depressions in the beach sand in an area several feet above normal high tide.

Remains of jellyfish in various stages of decomposition were found in several of the depressions. The remaining depressions were easily recognizable as having been formed by the same species, one that occurs in large numbers in that area.

At first, all the depressions were believed formed by jellyfish that had been partially covered by sand. But further inspection revealed that many depressions were the result of a caving in of sand over jellyfish that had been completely buried. Many were buried two to three inches below the surface and were not indicated by surface depressions.

The process by which the jellyfish were buried was probably similar to the way in which shells are buried.

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PSYCHOLOGY

Little Noise and Light Can Help You to Sleep

THE OLD joke about the man who could not sleep because the quiet kept him awake has received scientific support. Dr. R. C. Davis, Indiana University psychologist, reports people relax better in a little noise and light than they do in a dark sound-proofed room.

Subjects in the dark and quiet showed increased muscular and circulatory activity and decreased respiration, Dr. Davis reports in the *Journal of Comparative and Physiological Psychology*.

This pattern, Dr. Davis explains, is characteristic of anticipation. The subjects in the dark, he said, may have been less relaxed because they were "expecting something to happen."

Science News Letter, September 19, 1959

ASTRONAUTICS

Mice Relay Heartbeats

FIVE TINY black mice electronically relayed their heartbeats and other vital body data to listening scientists via "saddles" sewn on their backs.

The "saddles" are actually miniature radio transmitters. They are designed to allow scientists on the ground to keep track of the animals' heartbeats and respiratory rates during space flight, James Dickey, electronics engineer at Brooks Air Force Base, Texas, told SCIENCE SERVICE.

Similar transmitters were worn by mice who rode into space in a recent Air Force shot. The five mice on display were exhibited at the Air Force Association's 1959 Convention and Aerospace Panorama at Miami, Fla.

Eight or nine other black mice wearing the "saddles" were also displayed recently in a similar exhibit in Yugoslavia, Mr. Dickey said.

The little transmitters fit like saddles on the backs of the mice. They are sewn into the skin on each side of the mouse with wire sutures. Each transmitter holds a button-sized mercury-filled battery that will last for three days. Purpose of attaching the complete unit to the animals' backs is to give the rodents freedom of movement. Since mice die when restrained, they cannot be wired and tied down as can monkeys.

The heartbeat of a mouse sounds like the putt-putt of a motor-boat over a radio. From a space vehicle, however, the heartbeat will be recorded on earth not as sound, but as a line on a graph.

Each mouse is no more than three and one-half inches long, weighing 20 grams. The saddles each weigh five grams, Mr. Dickey said. The mice appear to enjoy chewing each other's transmitters, so they are kept separate at all times.

The mice are described as good-natured and unusually intelligent. They have already learned to hide their tails under their bellies if a human hand pops into their cage, thus making it difficult to pick them up by the tail, the usual method.

Since their hair is black, the greying effects of cosmic radiation in outer space will be visible when the first mice are successfully recovered from orbit, Mr. Dickey explained.

Science News Letter, September 19, 1959

GENERAL SCIENCE

Animal Study Adds To Man's Self-Knowledge

ANTS, MONKEYS and jackdaws can help man get a better picture of how and why he acts the way he does.

Learning from scientists' studies of the other animals is perhaps one of the most important links between the sciences and the humanities. Demonstrating this link is very important for the modern world, Sir James Gray, professor of zoology at the University of Cambridge, pointed out in his address as president of the British Association for the Advancement of Science meeting in York, England.

For example, Sir James said, there is the ant which he described as nature's first experiment in the social animal. Ant societies are characterized by a totalitarian basis, high levels of cooperation and an extreme aggressiveness toward different or strange individuals or groups. These societies illustrate how not to deal with international problems, Sir James said.

The hierarchy or grading within human society is also comparable with the feeding priority among a flock of jackdaws, for a second example of man's relatedness to other animals. A third example is the young chimpanzee's ability to learn, compared with man's ability.

In a very real sense, it is possible to view man and human society through "biological spectacles," Sir James said. Much can be learned if the individual and society will pay attention to the biological illustrations.

"It is easy to say that science should be welded to the humanities, but much less easy to suggest how this should be done," the British biologist said.

Education and a "plea for a wider outlook in the teaching of science" is one way this can be achieved, Sir James said. Good general practitioners in the art of education are urgently needed. The problem of whether to give the student a general overall view of the sciences and the "whole field of knowledge" or to let him specialize needs to be resolved, Sir James said. One solution may be to have the student survey this whole field of knowledge as a coherent picture before he undertakes specialized training.

"Science can only play its full part in furthering the welfare of mankind if it is used at a very early stage of education, as a means of encouraging a dispassionate but optimistic attitude towards all aspects of human affairs," Sir James concluded.

Science News Letter, September 19, 1959

ASTRONOMY

Galaxy Appearing to Be Formed Is Discovered

A NEW GALAXY that appears to be in the process of formation has been discovered.

If the galaxy is not forming in the wake of an older system, then the system may represent the wreckage left after the collision of two galaxies. Galaxies are giant aggregations of billions of stars like the Milky Way in which the sun and its planets, including earth, are located. The universe contains uncounted millions of galaxies.

Drs. E. Margaret and G. R. Burbidge, a husband and wife astronomical team now working at the Yerkes and McDonald Observatories of the University of Chicago, found the "remarkable extragalactic system" on plates taken with the 82-inch telescope at Fort Davis, Texas. The system consists of a number of large patches of light, all embedded in a luminous haze.

They suggest the two possible explanations of its nature in the *Astrophysical Journal* (July).

Science News Letter, September 19, 1959



WOMAN AND MOUSE—SCIENCE SERVICE medical writer Helen Buechler (Leavitt) holds one of the small black mice being studied. The electronic device on its back will transmit vital body data to recorders.

MEDICINE

Fingernail Growth Cut By Measles, But Not Diet

A GOOD CASE of the measles cuts down the growth of fingernails.

In fact, measles and kidney diseases appear to be the biggest inhibitors, Dr. Maarten S. Sibinga, pediatrician at New York University College of Medicine, explains.

Contrary to some beliefs, malnutrition and restricted diets do not alter the growth rate appreciably, he says. The average growth rate was found to be near .105 millimeters per day. This measurement was obtained by enlarging photographs taken daily of fingernails.

The average nail growth rate of males and females appears to be equal. However, fluctuations in growth rate were noticed at times in both sexes, the pediatrician said.

Since it is well known that the nails and hair grow after death, Dr. Sibinga measured the growth of the nails of three dead adults. The nail growth of two of them was followed for 10 days and that of the third was followed for eight.

Nail growth was found to be within the low normal average growth rate of live persons for the first two or three days after death. This was followed by a somewhat slower growth rate thereafter, and growth had not ceased at the time observations were discontinued.

However, within that observation period, Dr. Sibinga noted that measles appeared to have a more inhibiting effect upon nail growth than did death.

There are marked individual variations in the rate of nail growth at all ages, but for the same individual and the same nail the rate of growth is relatively constant and can be used to study the effect of various physiologic and pathologic disturbances, he concludes. Dr. Sibinga's report appears in *Pediatrics* (Aug.).

Science News Letter, September 19, 1959

ASTRONAUTICS

Shields for Astronauts Designed, Ready to Test

THE HEAT SHIELD to protect the first American astronaut from blast-furnace heat as he plunges back into the earth's atmosphere will soon be tested.

The National Aeronautics and Space Administration has not yet chosen "the" heat shield that it will eventually use on the Mercury capsule. But at least two are being developed. Tests are expected to start this month.

One heat shield is a three-inch-thick plate of beryllium six feet in diameter. This is called a "heat sink" because beryllium has the quality of absorbing vast quantities of heat.

The second kind of heat shield is the "ablation" type. It is understood that NASA has several varieties of ablating materials under development. The characteristics of these materials, however, is to flake off, melt or vaporize as they grow hot, thus carrying away heat from the capsule. One ablating material is a mat of

glass fibers and resin. At least one other material already exists—the ablating blanket for Atlas nose cones. Composition of this is still classified.

However, it is known that a phenolic resin, reinforced with asbestos, was used for the nose cone of the Vanguard satellite rocket because of its high heat resistance.

These heat shields will have a tough job. The Mercury capsule will plunge through the earth's atmosphere at 17,000 miles an hour as it returns from its space flight. Several inches in front of this capsule, which resembles the smokestack of a pioneer locomotive, a cushion of air may reach temperatures of 10,000 degrees Fahrenheit. Inside the capsule will be one of the seven young men now being trained for the historic flight. If this man is to survive, the heat shield lifesaver must do its job well.

A NASA official said all types of the heat shields would be thoroughly tested, but implied that the ablation process probably has the "inside track." Although beryllium is a relatively light metal, the beryllium heat sink would add hundreds of pounds to the overall vehicle.

Science News Letter, September 19, 1959

RADIO

Radio-in-Space Provision Termed Pressing Problem

MAKING adequate international provisions for space radio communications has been termed by a United States law expert "the most pressing current astronomical problem."

Andrew G. Haley, president of the International Astronautical Federation, told a London, England, meeting of the Federation that arrangements have been concluded with the International Radio Consultative Committee of the International Telecommunication Union for study of these radio-in-space problems:

1. What frequencies are especially suitable for penetration of the layers of the earth's atmosphere?
2. How does the time, season, geographical location and solar activity influence these frequencies?
3. What deviations in direction can be expected as radio waves penetrate the ionosphere?
4. What, if any, will be the difference in propagation between in-going and out-going signals relative to the earth?
5. Are special phenomena to be expected that do not occur in transmission between two points on earth?
6. What is the possible influence of the troposphere on wave propagation to and from satellites and rockets?

Some scientists, he said, believe the first commercial use of rockets will be for mail-carrying between New York and London. This service, and others, will be gradually extended to all quarters of the world.

National jurisdiction will be effectively maintained by the granting of launching and landing rights, he said, and thus there will be indirect national control with respect to point-to-point earth rockets.

Science News Letter, September 19, 1959

IN SCIENCE

CHEMISTRY

Russians Contribute to Element 102 Controversy

THE RUSSIANS have contributed to the controversy concerning the discovery of element 102, heaviest element yet made by man in the laboratory.

More than a year ago, University of California scientists reported they had discovered an isotope of element 102, using the heavy ion linear accelerator built by the Atomic Energy Commission. Simultaneously they reported they had been unable to duplicate the work of an international team of scientists who reported in 1957 that they had discovered a 102 isotope.

Now the Russians, according to the Department of Commerce, have conducted experiments confirming the California experiments. G. N. Flerov, a corresponding member of the USSR Academy of Sciences, said a large group of Russian physicists and chemists first made element 102 in the fall of 1957 by bombarding plutonium with oxygen ions accelerated in a cyclotron.

Although the results of the Moscow and Berkeley experiments agree, they are not in accord with those obtained by the international team working in Stockholm.

The suggested name for element 102 is nobelium. However, the honor of naming an element traditionally rests with its discoverers. Who discovered element 102, and its name, continue to be controversial.

The Russian work is reported in the *Scientific Information Report*, a translation made by the Central Intelligence Agency and distributed by the Department of Commerce of information received from countries behind the Iron Curtain.

Science News Letter, September 19, 1959

ROCKETS AND MISSILES

Track Space Vehicles By Doppler Shift

USING NO information except the time of the Doppler shift, earth satellites can be tracked by a single station for as much as 12 hours on end inside the limits of the solar system, Robert R. Newton, of the Applied Physics Laboratory of the Johns Hopkins University, Silver Spring, Md., told the International Astronautical Federation's congress, London, England.

The effective range of such a tracking station would be at least 30,000,000 miles.

The Doppler effect in radio corresponds to the change in pitch that a railroad whistle has when moving toward or away.

The Doppler system of measurement has only been used once before in this way. W. H. Guier and G. C. Weiffenbach, also Johns Hopkins scientists, used it to describe how six orbit functions of an artificial earth satellite could be determined during a single "pass" from one observing station.

Science News Letter, September 19, 1959

CE FIELDS

MEDICINE

700,000 More Patients Cared For in 1958

THE NUMBER of cases cared for last year in hospitals in the United States increased 700,000 over 1957 figures, the American Hospital Association reports.

There were 23,697,000 hospital admissions in 1958, compared to 22,993,000 in 1957, statistics reveal in the annual Guide Issue of *Hospitals*, the association's journal. The information was compiled from questionnaires received from 6,786 hospitals in the continental U. S.

The hospitals reported an all-time high of 3,742,000 births in 1958. Each day last year there were more than 1,300,000 patients and 43,000 newborn babies in hospitals.

The hospitals reported total expenses of \$7,133,493,000, of which \$4,660,191,000 was for payroll. The hospitals employed 1,464,829 personnel in 1958 an average of 111 personnel per 100 patients, as compared with 107 in 1957.

Voluntary short-term hospitals cared for 15,825,136 cases: the average patient stay in these hospitals was 7.4 days. These hospitals spent an average of \$29.24 per day for the care of each patient, an increase of \$2.43 over 1957.

Science News Letter, September 19, 1959

ELECTRONICS

Plotter System Watches Airplanes Over U. S.

A SYSTEM has been developed for keeping track of all airplanes, friendly or unfriendly, approaching or flying over the U. S.

The new plotting system, called Iconorama, will be installed at North American Air Defense Command (NORAD) headquarters at Colorado Springs, Colo., and at Strategic Air Command (SAC) headquarters at Omaha, Neb.

Iconorama shows almost instantly the positions of aircraft thousands of miles away, such as those that might be detected by the Distant Early Warning defensive radar network.

By projecting the automatically drawn tracks on a big screen, it has been demonstrated that the system can do the work of six men at the old clear-plastic plotting boards used since World War II.

The Iconorama system expands traffic information handling capacity by 400%. It is expected to pay for itself in four years by obviating human plotters.

Traces made by the planes being tracked are drawn on a coated slide by a moving stylus. Data received over existing teletype lines are made to guide the stylus over the slide, scribing a special metallic coating. The slide plot measures only one inch square, yet overall error of the projected

display is said to be about one part in 1,000.

As many slides as needed may be used to cover a given situation. Each is projected, in register, on the viewing screen and in its own identifying color.

When the slides become filled with tracks, or the situation is over, the slides are replaced. Each removed slide can be filed as part of the flight record of the plane it represents.

Leasing contracts for the Iconorama system, made by Fenske, Fedrick and Miller, Inc., Los Angeles, call for installation to be completed at NORAD by July, 1960, and at SAC by October, 1959.

Iconorama units already have been installed and operated at the Pacific Missile Range, Point Mugu, Calif.; the White Sands Missile Range in New Mexico; the Atlantic Missile Range at Cape Canaveral, Fla., and the Naval Research Laboratory, Washington, D. C. Lockheed Aircraft Corporation also is understood to have signed a contract for use of Iconorama at its Palo Alto, Calif., control center.

Science News Letter, September 19, 1959

ASTRONAUTICS

Mars and Venus Sample To Be Studied at Harvard

SAMPLES of the "air" from Mars and Venus, simulated to the best of present knowledge, will be studied in a Harvard University research laboratory.

Under a \$300,000 grant by the National Science Foundation, Harvard scientists will use the simulated gas mixtures to learn about entry problems in the atmospheres of Mars, Venus and other planets. Their aim is to find what space ships will face when entering the atmospheres of planets at temperatures of 18,000 degrees Fahrenheit.

The work is part of a program of space-age basic research financed by the National Science Foundation. NSF has also granted \$500,000 to Massachusetts Institute of Technology for studies of possible methods of controlling the H-bomb process of fusion, and for studies of space and space craft. The Harvard and MIT grants are both for two-year periods.

Harvard scientists also will study rocket propulsion using electromagnetic fields rather than chemical reactions, the basic process of combustion in various mixtures of gases and liquids, the hydrogen fusion process, sunspots and solar flares.

At MIT all work will fall within the framework of a "plasma dynamics program." It will include the study of ionized gases, or plasmas, such as exist in the upper atmosphere of the earth. Plasmas also are found in fluorescent light tubes and in the sun.

MIT scientists will explore the nature of plasma through which space craft some day will have to pass. Also to be studied are plasma effects on reentry of nose cones and missiles, plasma as a factor in radio communication, production of plasma using microwaves, and study of microwaves which plasmas themselves emit.

Science News Letter, September 19, 1959

MEDICINE

Liver Diseases Spotted By Radioactive Technique

DIAGNOSIS of cirrhosis and other liver ailments is being aided by a new radioactive technique that measures the time it takes blood to flow from the heart to the liver.

The technique was developed at the University of California Medical Center, Los Angeles, by Drs. Ismael Mena, Leslie R. Bennett, Raymond Kivel, Joseph Scallion and Sherman M. Mellinkoff.

Basis of the procedure is the time it takes for injected radioactive serum albumin to go from the heart to the liver. Two external scintillation counters (which measure degree of radioactivity) are used to determine this. One is placed over the heart, the other over the liver.

In cirrhosis of the liver the organ becomes damaged so that blood flow through it is progressively slowed. This creates a pressure area in the portal vein, one of two ports of entry for flow into the liver. (The other is the hepatic artery.) The decreased rate of flow of the blood containing the radioactive material into the liver is a reliable indication of the degree of liver damage.

The procedure is not specific to liver disease. For example, obstructions in blood vessels, such as hardening of the arteries or blood clots in veins, may delay the arrival of the blood's radioactive "passenger" into the liver.

However, results of the procedure taken in conjunction with the patient's history and other clinical findings has proved very useful in diagnosis of liver conditions.

More than 800 subjects have been studied with the new procedure, and it has been found consistently helpful in diagnosing cirrhosis, the UCLA medical scientists reported.

Science News Letter, September 19, 1959

BIOLOGY

Virus Sickens Plant But Aids Insect

THE FIRST PLANT virus known to help out an insect has been reported.

The plant virus, known as "aster yellows," increases the number of foods the tiny corn leafhopper can eat, Dr. Kark Maramorosch of Rockefeller Institute, New York, told scientists at the American Phytopathological Society meeting in University Park, Pa.

The aster yellows virus, which affects asters, lettuce, spinach and carrots, is carried from sick to healthy plants by another tiny insect, the leafhopper. This insect is also slightly affected by the virus which lives and multiplies inside it.

However, Dr. Maramorosch explained, when the corn leafhopper sucks up the virus, it then is able to feed and thrive on healthy asters and carrots—foods that normally would have poisoned the insect.

This may mean an "entire new field of research" into the possible beneficial effects of plant viruses, the scientist concluded.

Science News Letter, September 19, 1959

OCEANOGRAPHY

Oceanographers Need Ships

Especially designed research ships are needed to permit oceanographers to probe a frontier whose importance to man far exceeds the meager knowledge he has of it.

By RICHARD LITELL

THIS COUNTRY is in urgent need of ships equipped to probe the secrets of the sea.

The Federal Government is spending millions of dollars and a great deal of time in an effort to explore and conquer outer space, but man has a "space" of his own right here on earth that he dare not neglect.

Less remote, more definable, but just as much in need of exploration, this "space" is the vast body of water we call the oceans—329,000,000 cubic miles of salt water.

The oceans cover 70.8% of the earth's surface and man's knowledge of them is indeed meager when compared to their importance to him. It has been claimed that only two percent of the ocean depths have been mapped and that we know more about the surface of the moon than we know about many areas of the oceans.

Ocean movements play a major role in regulating climates, but we have yet to determine the structures of currents at all depths. Knowledge of the ocean floor can tell us much of the earth's history and composition, yet we need to know much more about ocean-bottom topography and sediments and the nature of the bedrock beneath the ocean floor.

Much must still be learned about chemical constituents of sea water and how they influence life in the sea. We must learn more about the interchange between ocean and atmosphere, productivity of sea life and many other areas.

Oceanic research has military implications as well. Submarines, for example, cannot function properly in strategic areas without adequate knowledge of currents, bottom topography, the velocity of sound in water, ocean temperatures and weather.

Missiles and satellites are needed for scientific advancement—but so are research ships. Yet disproportionately more money and effort is going into rocket production than into the construction of research vessels.

This is a serious shortcoming in view of a report by the Committee on Oceanography of the National Academy of Sciences-National Research Council, which stressed that neglect in the area of ocean research might well result in this country being placed in a precarious position from the scientific, technological and military points of view.

In contrast to our meager fleet of about 45 research ships, the Russians are reported to have some 105 ships of various kinds presently engaged in oceanic research.

They started by converting ships origi-

nally designed for other purposes, but have graduated to specially constructed research ships such as the 5,960-ton Mikhail Lomonosov, commissioned in 1957.

The United States, on the other hand, has only one vessel originally designed for research purposes, although the inadequacies of conversion for scientific work have long been recognized. This ship is the 298-ton R/V Atlantis of the Woods Hole Oceanographic Institution in Woods Hole, Mass., which was built in 1931. All other U. S. research ships, located at several oceanographic institutions and laboratories along both coasts, are conversions from yachts, warships, tugboats and fishing vessels.

The situation is not as bleak, however, as a comparison of total ships and total tonnage would indicate. Actually this country has accumulated a more impressive store of knowledge in the field of oceanography than any other nation. This is no doubt due to the higher caliber of U. S. ocean-

graphic institutions and the interest shown by the U. S. Navy.

Whereas the Russian effort in the marine sciences is concerned largely with extensive, detailed, exploratory surveying, American efforts represent essentially the verification of hypotheses. That is, our scientists plan certain experiments with a good idea of what the results will be. Then they go out in ships to gather the critical data in the hope of confirming their expectations. They generally do.

All things considered, the United States seems to hold the lead in oceanographic research. But it is rapidly losing that lead because of foreign advances in the building of research ships. Only the construction of new research ships can allow us to maintain our advantage.

The NAS-NRC Committee's report on the current status of the marine sciences in this country contained a series of "minimal" recommendations for the improvement of oceanographic research. It urged the Government to expand its support of the marine sciences at a rate which would result in at least a doubling of basic research activity during the next ten years. It also urged that this increased support be accompanied by a new program of ocean-wide surveys, requiring a doubling of the present research effort.

Neither of these recommendations can be carried out without an increase in the number of research ships available for exploration.

With specific regard to ships, therefore, the Committee further recommended that a shipbuilding program be started, aimed at replacing, modernizing and enlarging the number of ocean-going ships now being used for research, surveying and development.

It proposed increasing the present fleet of about 45 ships to 85 ships during the next decade. Taking into account the replacement of ships that must be retired during that period, this means that 70 new ships should be constructed at a total estimated cost of \$213,000,000. The Committee discouraged meeting recommended requirements through the conversion of vessels originally designed for other purposes. Conversion represents a compromise on requirements, which can only lead to a compromise on research.

The ideal research ship should provide for quiet operation, efficient crew-to-scientist ratio, high maneuverability at slow speed, suitable arrangement of laboratory space and living quarters, the ability to remain at sea for extended periods in all climates, the ability to allow work to be done in high seas, and adequate deck, office, berthing, mess, helicopter and sonar spaces.

For acoustic experiments, auxiliary equipment must be at least as quiet as the noise of the sea at sea state one. (Sea states are graded from one to nine, in order of severity. Most landlubbers tend to become seasick at sea state four.)



R/V ATLANTIS—This 142-foot ketch, built in Copenhagen 28 years ago, is the only research vessel in the United States originally designed for that purpose. It belongs to the Woods Hole Oceanographic Institution. One of the ships scheduled to be replaced within the next ten years, the Atlantis accommodates nine scientists, has a crew of 19 and a range of about 4,000 n miles.

The ratio of crew members to number of scientists should be about one to one. That is, there should not be more crew members than scientists. This is economically unsound.

The ability to maintain headings at very slow speeds requires a carefully considered main propulsion system and possibly some sort of bow propulsion.

A good ship, stabilized with antiroll tanks and with the proper lines to minimize pitching, should permit work to be performed in a sea of state five.

Only especially designed ships will meet all these requirements and facilitate efficient oceanic research. And it is these requirements that the Committee's specific recommendations are designed to meet.

Of the total fleet of 85 ships the Committee believes could be available by 1970 (70 new ones and 15 existing ones), 22 would be basic research ships for use by private laboratories with Government support, 20 would be military research and development ships serving the various Navy laboratories, 29 would be survey ships used to map the oceans, and 14 would be resources and fisheries ships, which would also be designed to be able to catch fish.

Of the 70 to be built, 31 should be in the 500-ton class, 28 between 1,200 and 1,500 tons, and 11 larger than 2,000 tons, the Committee specified.

It also recommended that five separate groups finance the new construction—the Navy, the Coast and Geodetic Survey, the National Science Foundation, the Maritime Administration, and the Bureau of Commercial Fisheries.

In our enthusiasm over the new frontier of space, we must not neglect an as yet unconquered frontier on our own globe. The oceans are indispensable, and our reliance on them can only increase. Marine scientists need hardware as much as space scientists do. And their basic hardware is the research ship.

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Questions

BOTANY—What influences the attachment of giant kelp plants? p. 180.

GENETICS—How many chromosomes does a male chicken have? p. 179.

MEDICINE—Which diseases have been found to inhibit fingernail growth? p. 184.

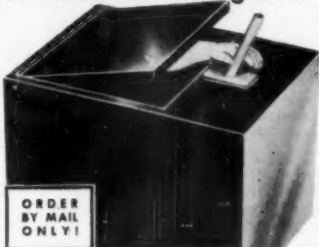
Photographs: Cover and p. 186, U. S. Navy; p. 179, Stanford Medical Center; p. 183, U. S. Air Force; p. 192, Kier Products Co.

Do You Know

A low-cost method for producing paper and cellulose from *corn stalks* has been developed by two Israeli scientists.

Every flock of *chickens* has a well organized peck-order in which each bird has the "right" to peck some members of the flock but not others.

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

THE ABC OF RELATIVITY—Bertand Russell—Allen & Unwin (*Essential Bks.*), rev. ed., 139 p., \$3.75. Explains for the nonmathematical reader Einstein's ideas of special and general relativity and their practical applications to gravitation.

ADVANCES IN APPLIED MICROBIOLOGY, Vol. 1—Wayne W. Umbreit, Ed.—*Academic*, 304 p., \$9.50. Critical and definitive reviews of areas of microbiology of interest to the practical microbiologist, including reviews by foreign contributors.

AMERICAN RESEARCH ON RUSSIA—Harold H. Fisher, Ed.—*Indiana Univ. Press*, 240 p., \$5. This survey shows the areas and topics covered, analyzes the results and points out the gaps in need of further research.

ANCIENT POPULATION OF SIBERIA AND ITS CULTURES—A. P. Okladnikov—*Peabody Museum*, Russian Translation Series, Vol. I, No. 1, 96 p., illus., paper, \$3.50. Study by a leading Soviet archaeologist of the settlement of Siberia.

BASIC AUDIO, Vols. 1, 2 and 3—Norman H. Crowhurst—*Rider*, 368 p., illus., 3 vols. bound in one cloth binding \$9.95, paper \$8.70, single vol. paper \$2.90. Picture-book course, explaining the part each component plays in the audio system.

A BIOLOGICAL SURVEY OF KATMAI NATIONAL MONUMENT—Victor H. Cahalane—*Smithsonian*

Inst., Misc. Coll. Vol. 138, No. 5, 246 p., 17 plates, map, paper, \$3. Biological study of the unspoiled wilderness near the base of the Alaskan Peninsula in southwestern Alaska.

BLAKESLEE: The Genus Datura—Amos G. Avery, Sophie Satina and Jacob Rietsema, foreword and biographical sketch by Edmund W. Sinnott—*Ronald*, 289 p., illus., \$8.75. Complete account of the genetic investigations which Blakeslee and his associates carried on for over 40 years with several species of the plant genus Datura.

BOY'S BOOK OF TURTLES AND LIZARDS—Percy A. Morris—*Ronald*, 229 p., illus., \$4.50. For the beginning naturalist, it describes U. S. turtles and lizards, their size, markings, color, structure, habitat and food, and their known geographical limits.

CAREERS IN ELECTRONICS—Juvenal L. Angel—*World Trade*, 2nd rev. ed., 30 p., paper, \$1.25. Describes opportunities, training, areas of specialization, advantages and disadvantages of a career in electronics.

THE CHEMICAL ELEMENTS—Helen Miles Davis, rev. by Glenn T. Seaborg—*Science Service*, 2nd rev. ed., 198 p., paper, 50¢. The story of man's discovery of the building blocks of the universe. Up-to-date, fully indexed, valuable reference for student, teacher and chemist.

A DICTIONARY OF ELECTRONIC TERMS: Concise Definitions of Words Used in Radio, Television and Electronics—Robert F. Beam, Ed.—*Allied Radio*, 5th ed., 80 p., illus., paper, 35¢.

DICTIONARY OF SPOKEN RUSSIAN, Russian-English and English-Russian—*Dover*, 573 p., paper, \$2.75. More than 30,000 usable Russian

sentences and phrases, pronunciation guide, short grammar, geographical terms, weights and measures, holidays and foods.

DICTIONARY OF SPOKEN SPANISH, Spanish-English and English-Spanish—*Dover*, 513 p., paper, \$1.75. Based on phrases and complete sentences rather than isolated words, for travel, study and business.

DIRECTORY OF NUCLEAR REACTORS, Vol. I: Power Reactors — *Internat'l Atomic Energy Agency (Internat'l Publications, N.Y.)*, 214 p., paper, \$3.50. Concise, authentic information on the 36 power reactors expected to be in operation by 1962 in the U.S., Great Britain, U.S.S.R., France, Belgium, Canada, Czechoslovakia and Sweden.

EDUCATING THE GIFTED: A Book of Readings—Joseph L. French, Ed.—*Holt*, 555 p., \$5.50. Selections discuss identifying characteristics, general and special school programs, acceleration, adjustment, underachievement and teacher training.

FUNDAMENTALS OF ELECTRONICS—F. H. Mitchell—*Addison-Wesley*, 2nd ed., 260 p., illus., \$6.50. Textbook for one-semester introductory course in electronics.

HOW OLD IS THE EARTH?—Patrick M. Hurley—*Doubleday*, 160 p., illus., paper, 95¢. On the structure of the earth, radioactivity, the measurement of geologic time and radiocarbon dating.

HUMAN EVOLUTION: Readings in Physical Anthropology—Noel Korn and Harry Reece Smith, Eds.—*Holt*, 447 p., illus., \$5.50. Provides material on classic Mendelian genetics, human population, evolutionary forces, paleontology, human fossil records and race.

AN INTRODUCTION TO PLASTICITY—William Prager—*Addison-Wesley*, 148 p., illus., \$9.50. Designed to supplement traditional texts on strength of materials and theory of structures primarily concerned with elastic behavior.

INVESTMENTS FOR PROFESSIONAL PEOPLE—Robert U. Cooper—*Macmillan*, rev. ed., 342 p., \$4.95. Offers the busy professional man or woman the tools for a systematically planned investment program.

LABORATORY EXERCISES FOR PHYSICS—Harvey E. White with Eugene F. Peckman—*Van Nostrand*, 184 p., illus., paper, \$2.96. Laboratory manual for students enrolled in an introductory course in fundamental physics.

LIFE UNDER THE MICROSCOPE—William M. Hutchinson, text by Kathleen Henderson—*Maxton Pubs.*, 30 p., illus., 69¢. Illustrations based on exhibits in the American Museum of Natural History.

LIVING INSECTS OF THE WORLD—Alexander (Continued on page 190)

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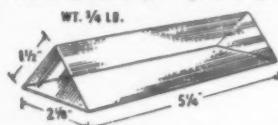
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Books of the Week

(Continued from page 188)

B. Klots and Elsie B. Klots—*Doubleday*, 304 p., 277 photographs by Andreas Feininger and others, drawings by Su Zan Noguchi Swain, \$9.95. Survey of the insect world and their extraordinary behavior, much enhanced by beautiful close-up color photography.

MAGNETS: The Education of a Physicist—Francis Bitter—*Doubleday*, 155 p., illus., paper, 95c. Reminiscences of a physicist, serving as a lively introduction to the physics of magnetism, written for the layman and young student.

MAN OF COURAGE: The Story of Dr. Edward L. Trudeau—Kathryn E. Harrod—*Messner*, 102 p., \$2.95. Biography of the physician who founded America's first tuberculosis sanitarium.

MAXIMUM PERMISSIBLE BODY BURDENS AND MAXIMUM PERMISSIBLE CONCENTRATIONS OF RADIONUCLIDES IN AIR AND IN WATER FOR OCCUPATIONAL EXPOSURE—*Nat. Bureau of Standards (Govt. Print. Off.)*, Handbook 69, 95 p., paper, 35c. Recommendations of the National Committee on Radiation Protection. Supersedes Handbook 52.

THE MODERN FAMILY HEALTH GUIDE—Morris Fishbein, Ed.—*Doubleday*, 1001 p., \$7.50. A home-reference volume of authoritative medical advice on diet, infant and child care, heart trouble, cancer, mental disturbances and other medical subjects. Also an encyclopedia of commonly used medical terms with simple definitions.

PETROLEUM REFINERY MANUAL—Henry Martyn Noel—*Reinhold*, 182 p., illus., \$7.95. Handbook of information on refinery design, construction and equipment, with emphasis on newer processes.

PLASTIC MAGIC: The Material of a Million Uses—C. B. Colby—*Coward-McCann*, 48 p., illus., \$2. Quick survey for the layman of the field of plastics, the different kinds, special uses and ways in which they are made.

RADIATION PRESERVATION OF FOOD—U.S. Army Quartermaster Corps.—*Off. of Tech. Serv.*, 461 p., illus., paper, \$5. Survey of the historical, physical and chemical aspects of food preservation by irradiation, and the biological and technological processes involved. Bibliographies included.

ZOO CELLEBRITIES—William Bridges—*Morrow*, 127 p., photographs by Sam Dunton, \$2.95. Entertaining Bronx Zoo stories about cheetah, otter, gorilla and other animals.

Science News Letter, September 19, 1959

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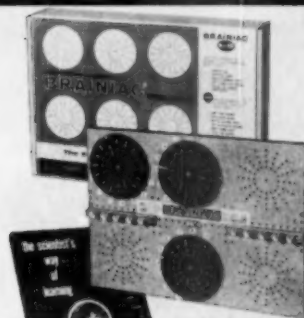
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CLOTHES HOOK CHAIN for closets enables articles to be hung at all levels. Designed to save closet space, the chrome chain consists of clothes hooks linked together.

Science News Letter, September 19, 1959

CAMPING STOOL weighs only one and a half pounds and folds to six by six and a half inches. The stool is constructed of sturdy steel and canvas. It is a great convenience for portability and space saving. The stool has a six- by 12-inch seat when unfolded.

Science News Letter, September 19, 1959

ELECTRICAL OUTLET mounted on the wall can hold eight or more plugs simultaneously. Although all eight appliances should not be turned on at the same time, the tangled wires and the inconvenience of having to disconnect one plug to insert another are eliminated. The outlet is 11½ inches long.

Science News Letter, September 19, 1959

DANCING DOLLS go into a lively dance when a spring is wound. The dolls, 8½ inches high, are imported and colorfully dressed. A Red Riding Hood doll, a goose girl doll, and Scotch dolls with clan



skirts and English dolls in sailor outfits, shown in the photograph, are available.

Science News Letter, September 19, 1959

LIGHT CONTROLLER for the home automatically turns lights on in the evening

and turns them off the next morning. The device, placed next to a window, is responsive to natural light conditions. It can eliminate returning home to a dark house.

Science News Letter, September 19, 1959

METAL CUTTER is a single shear made of aluminum and weighing only 12 ounces. It drills its own starter hole in light materials. The shear is said to cut cleanly and accurately on a variety of sheeting and most nonbrittle material.

Science News Letter, September 19, 1959

ELECTRICAL COMBINATION LOCK has no tell-tale tumblers to guide burglars. When the correct combination is dialed, an electrical circuit is completed. The lock can be supplied with four different combinations, each performing a different job. Combinations can be changed without the aid of a locksmith.

Science News Letter, September 19, 1959

-SOLITAIRE BOARD for devotees who like their rows of cards straight is made of plastic-coated hardboard. Seven rows of diagonal slots hold the seven rows of cards and four special plastic clips at the top hold the aces.

Science News Letter, September 19, 1959



Nature Ramblings



By HORACE LOFTIN

Autumn Flight

THERE IS A NIP in the air now over much of the country, warning the human population to look to the fuel supply, check the furnace, and get topcoats out of moth balls. Some persons are even making preparations for a "flight" south to avoid the rigors of the coming winter.

The same is true among the animals.

Those that must spend the winter in the north are laying in fuel, in the form of a thick layer of fat, for nourishment and warmth in the cold days ahead. Others are preparing their homes with extra linings of warm leaves and patching weak spots. As for topcoats, the furred animals are putting on fine new pelts.

There are the lucky ones which simply leave the cold and snow behind them, as they fly to the southlands. The autumn migration has already begun for many or most of the northern-nesting birds. Those like the barn swallow which spend the winter on the South American continent have virtually all abandoned their summer



homes and can be seen in growing flocks along the river courses and coasts of the southern states. They stay for a while, as if gaining courage for the flight over the Gulf and Caribbean. Then one day they all go, leaving the area empty and waiting for another group of late-arriving migrants.

In terms of distance covered, shorebirds hold the record for autumn migration. The Arctic tern, for example, nests above the Arctic Circle in summer, then flies south to spend the winter below the Antarctic Circle.

The golden plover also equals this tern in its long-distance flight.

The minute ruby-throated hummingbird excites admiration by its autumn flight, too. This bird, barely three inches in length, regularly flies across the Gulf of Mexico, from the United States coast to Yucatan, on its way south. This is a flight of 500 miles across an open expanse of ocean.

The most assiduous autumn migrants among birds are the insect-eaters, such as the swallows and warblers. When cold weather strikes, their insect prey either dies or hides away. Thus they cannot feed and migration is imperative. Many of the seed eaters tend to remain in the north as long as they can scratch food from the litter of forest or field.

Many ducks and geese are reluctant to move southward, staying as far north as the presence of non-frozen water will allow them. On the other hand, there are sun-lovers like the teal which head for Florida and the tropics when Jack Frost puts in his appearance.

Science News Letter, September 19, 1959

